Spectroscopic Results for the Motions of Stars in the Line of Sight, obtained at the Royal Observatory, Greenwich, in the year 1886. No. X.

(*Communicated by the Astronomer Royal.*)

The results here given are in continuation of those printed in the *Monthly Notices*, vol. xxxvi. p. 318, vol. xxxvii. p. 22, vol. xxxviii. p. 493, vol. xli. p. 109, vol. xlii. p. 230, vol. xliii. p. 81, vol. xliv. p. 89, vol. xlv. p. 330, and vol. xlvi. p. 126. The observations were made with the "half-prism" spectroscope, one "half-prism" with a dispersion of about $18\frac{1}{2}°$ from A to H being used throughout. Eyepieces with magnifying powers of 14 and 22 respectively were employed.

The cylindrical lens has always been used in front of the slit as in the observations made previously to 1881. The observations of the Moon and of the sky have been made as a check on the general accuracy of the results.

The day specified in the first column is the Civil Day, and the hour is that of Greenwich Civil Time, commencing at Greenwich Mean Midnight, and reckoning from 0 to 24 hours.

Motions of Stars in the Line of Sight, in Miles per Second, observed with the Half-prism Spectroscope.

(+ denotes Recession; − Approach.)

The initials M., N., and L. are those of Mr. Maunder, Mr. Nash, and Mr. Lewis respectively.

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Estimd.	Remarks.
					α Andromedæ.			
Jan. 27	19	M	2	F	+15·4	−26·4	−23·6	Spectrum fairly steady.
Feb. 1	19	M	2	F	+14·7	−75·3	−44·2	Definition poor.
Nov. 5	23	M	2	F	+ 8·6	(− 2·0)	(+ 2·5)	Spectroscope out of adjustment.
					γ Pegasi.			
Feb. 1	19	M	2	F	+15·0	− 6·5	− 5·7	Definition bad; star-line seen with great difficulty.
					β Arietis.			
Feb. 1	19	M	2	F	+18·4	−85·4	−45·5	Definition very bad.
Dec. 4	21	M	4	F	+12·1	+12·4	+11·8	Definition good.
					β Persei.			
Jan. 27	20	M	2	F	+16·8	−50·2	−46·4	Definition fair.
Feb. 1	20	M	2	F	+17·1	−28·6	−30·7	Wind high but definition fair.

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Estimd.	Remarks.
					β Persei.			
Nov. 29	20	M	6	F	+ 3·9	+ 4·3	+ 2·1	Definition good.
Dec. 4	22	M	4	F	+ 5·4	−111·8	−106·4	Spectrum faint; definition poor.
14	20	M	5	F	+ 8·3	+12·2	+13·6	Definition fair.
14	20	L	5	F	+ 8·3	− 3·4	+12·1	Definition fair.
					α Persei.			
Jan. 27	20	M	2	F	+15·1	−40·9	−34·8	Definition fair.
Feb. 1	20	M	2	F	+15·6	−21·2	−25·7	Wind very high; definition poor.
Nov. 29	21	M	2	F	+ 2·0	+ 6·8	+ 7·6	Star-line faint.
Dec. 4	23	M	2	F	+ 3·5	−10·4	− 7·6	Definition good.
					Aldebaran.			
Jan. 27	20	M	2	F	+16·3	+22·9	+ 8·3	
Mar. 3	21	M	2	F	+18·5	+24·8	+13·4	Definition poor.
17	20	M	2	b_1	+17·4	+13·6	+24·9	Definition poor.
Nov. 17	23	M	4	F	− 4·1	+44·3	+40·0	Star-line faint.
29	22	M	2	F	− 0·2	+18·9	+18·2	Definition poor.
Dec. 4	23	M	2	F	+ 1·5	+41·5	+43·0	Definition fair.
					Capella.			
Jan. 27	22	M	4	F	+12·9	− 4·0	− 3·9	Star-line very well seen.
Mar. 3	21	M	2	F	+17·1	−54·5	−52·5	Definition fair.
17	20	M	2	b_1	+16·9	+42·3	+46·6	Star-line faint.
23	21	N	2	b_1	+16·6	−20·8	−16·6	Spectrum tremulous; star-line faint.
Apr. 6	22	N	2	F	+15·1	+ 1·5	− 0·4	Spectrum tremulous.
Nov. 29	22	M	2	F	− 3·8	+29·5	+30·2	Star-line faint.
					Rigel.			
Jan. 27	21	M	2	F	+12·9	+30·6	+17·8	Star-line fairly well seen.
Feb. 1	20	M	2	F	+13·7	+ 5·5	+ 0·3	Wind *very* high; star-line seen with great difficulty.
Mar. 3	20	M	2	F	+16·0	+19·4	+ 8·8	Definition poor; measures rough.
Nov. 5	23	M	2	F	− 8·4	(+58·5)	(+61·6)	Spectroscope out of adjustment.
18	0	M	2	F	− 5·4	+ 9·8	+ 9·6	Star-line distinct and well-defined.
					γ Orionis.			
Jan. 27	21	M	2	F	+13·6	+ 4·9	− 2·7	Star-line very well seen.
Feb. 1	20	M	2	F	+14·6	− 1·3	− 4·0	Wind very high; star-line seen with great difficulty.

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Estimd.	Remarks.
					γ Orionis.			
Mar. 3	20	M	2	F	+17·8	+ 6·3	+ 0·6	Star-line seen with great difficulty.
Nov. 18	1	M	4	F	− 7·2	+11·5	+11·6	Spectrum fairly bright and steady.
					β Tauri.			
Jan. 27	21	M	2	F	+13·8	−38·0	−37·9	Star-line fairly well seen.
Feb. 1	21	M	2	F	+14·8	−25·4	−25·3	Wind very high. Definition bad.
Mar. 3	20	M	4	F	+18·4	−31·5	−35·1	Definition poor.
Nov. 18	1	M	2	F	− 8·0	− 8·0	− 8·1	Star-line well seen.
					δ Orionis.			
Jan. 27	21	M	2	F	+12·7	+ 7·8	+ 3·8	Spectrum rather faint and tremulous.
					ε Orionis.			
Jan. 27	21	M	2	F	+12·4	+14·8	+ 7·3	Spectrum rather faint and tremulous.
					ζ Orionis.			
Jan. 27	21	M	2	F	+12·1	+13·2	+14·2	Spectrum rather faint and tremulous.
					κ Orionis.			
Jan. 27	21	M	2	F	+10·9	−21·4	−19·1	Star-line fairly well seen.
					α Orionis.			
Mar. 17	21	M	2	b_4	+17·8	+34·0	+39·4	Definition fair.
					β Aurigæ.			
Jan. 27	22	M	2	F	+11·3	−35·5	−40·9	Spectrum rather faint and tremulous.
Mar. 3	21	M	2	F	+16·8	−58·7	−55·1	Definition fair.
					γ Geminorum.			
Jan. 27	22	M	6	F	+ 9·5	−48·1	−40·7	Spectrum bright and steady, but star-line exceedingly broad and diffused and difficult to bisect.
Feb. 1	21	M	2	F	+10·9	−43·7	−34·2	Wind very high; definition bad.
					Sirius.			
Jan. 19	22	M	2	F	+ 4·4	−13·7	−13·1	Spectrum very tremulous.
27	22	M	6	F	+ 6·3	−32·6	−32·2	
Mar. 3	22	M		F	+12·6	−38·6	−35·7	Definition bad. Star in light cloud.
Nov. 5	1	M	4	F	−12·3	(+31·0)	(+32·3)	Spectroscope out of adjustment.
18	2	M	6	F	−10·6	+ 8·4	+ 8·3	Star-line well seen.

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Concluded Motion of Star. Estimd.	Remarks.
				Castor.				
Jan. 27	23	M	2	F	+ 6·2	+29·2	+32·1	Spectrum tremulous; star-line very ill-defined.
Apr. 6	23	N	4	F	+18·0	−14·9	−15·8	Star-line ill defined.
May 1	22	M	2	F	+16·4	+24·7	+13·0	Definition good.
Nov. 18	2	M	2	F	−14·7	+27·8	+27·2	Star-line well seen.
				Procyon.				
Jan. 18	23	N	3	F	+ 1·5	+ 0·3	− 1·5	Spectrum bright; definition fair.
27	23	M	6	F	+ 4·4	−13·8	−13·5	Spectrum bright; definition good.
28	22	N	1	F	+ 4·7	− 4·1	− 4·7	
Mar. 3	22	M	4	F	+13·6	−38·8	−41·3	
Apr. 6	22	N	2	F	+17·5	−21·5	−21·9	
May 1	21	M	2	F	+16·6	−57·9	−41·3	Definition bad; measures very rough.
Nov. 18	2	M	4	F	−15·4	+ 9·5	+ 9·8	Star-line well seen.
				Pollux.				
Jan. 27	23	M	2	F	+ 5·3	−45·1	−51·8	Definition good.
Mar. 17	22	M	2	b_1	+16·8	−29·4	−39·0	Star-line difficult to see.
23	23	N	2	b_1	+17·4	−24·3	−23·8	Measures rendered difficult by mist.
Apr. 6	23	N	2	F	+18·1	−30·5	−29·9	Spectrum tremulous; star-line faint.
May 1	22	M	2	F	+16·9	−45·8	−45·1	Measures made with great difficulty.
Nov. 18	2	M	2	F	−15·5	−15·5	−12·3	Star-line fairly well seen at times.
				Regulus.				
Apr. 30	22	N	2	F	+17·2	−17·2	−17·2	
May 3	23	M	2	F	+17·5	+ 1·8	+ 4·7	Spectrum bright; definition fair.
6	23	N	2	F	+17·6	−14·3	−13·4	Measures made with difficulty.
15	21	M	2	F	+17·9	− 5·2	− 3·4	Star-line very ill-defined.
18	23	N	2	F	+17·9	− 3·0	− 2·9	Star-line diffused and faint.
				β Ursæ Majoris.				
May 1	23	M	2	F	+12·7	+ 5·7	− 2·0	Spectrum faint; measures rough.
				α Ursæ Majoris.				
May 1	23	M	2	F	+11·7	−59·7	−52·7	Star-line very difficult to see.
June 16	1	N	2	b_1	+ 8·7	−57·3	−57·5	

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Estimd.	Remarks.
					δ Leonis.			
May 15	22	M	2	F	+16·8	−44·0	−50·1	Definition fair.
					β Leonis.			
Apr. 30	23	N	2	F	+13·6	−30·5	−30·3	
May 4	1	M	2	F	+14·2	−10 9	−10·5	Spectrum fairly bright and steady.
15	22	M	2	F	+15·9	−14·7	−13·8	Definition fair.
					γ Ursæ Majoris.			
May 1	23	M	2	F	+11·7	+ 1·2	+ 0·8	Star-line very ill-defined.
June 16	0	N	2	b_1	+10·9	− 2·9	− 2·8	Spectrum faint, but star-line seen well at times.
					γ Virginis.			
May 4	1	M	2	F	+10·3	−43·6	−41·1	Spectrum fairly bright and steady.
					ε Ursæ Majoris.			
May 1	23	M	2	F	+ 9·5	− 5·1	− 3·0	Star-line very ill-defined.
					α Canum Venaticorum.			
May 13	22	M	2	F	+11·9	−35·6	−36·8	Spectrum steady, but definition poor.
					Spica.			
Apr. 30	23	N	2	F	+ 5·7	−16·5	−15·7	
May 4	1	M	2	F	+ 6·6	−60·8	−53·4	Spectrum very tremulous.
18	23	N	2	F	+10·5	− 7·4	− 6·4	Definition poor; measures rough.
					ζ Ursæ Majoris.			
May 2	0	M	2	F	+ 8·4	+ 6·5	+ 7·0	Definition fair.
					Arcturus.			
Apr. 30	23	N	2	F	+ 4·8	−21·0	−21·5	
May 4	2	M	2	F	+ 5·5	−71·3	−64·6	Spectrum bright; definition good.
6	23	N	2	F	+ 6·2	−23·7	−23·9	
13	22	M	2	F	+ 7·8	−35·0	−39·4	Spectrum bright, but definition poor.
18	23	N	2	F	+ 8·9	−35·0	−33·5	
20	22	N	2	F	+ 9·3	−26·5	−27·8	Star-line very indistinct.

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Estimd.	Remarks.
				Arcturus.				
June 7	22	M	2	b_1	+12·5	−49·1	−46·9	Spectrum and star-line rather faint.
15	23	N	2	b_1	+13·5	−57·3	−54·2	
28	23	M	2	b_1	+14·7	−37·8	−38·7	Definition poor.
July 5	23	M	2	F	+15·1	−36·8	−38·9	Star-line seen fairly wel at times.
				ϵ^2 *Bootis.*				
June 28	23	M	2	F	+12·7	−15·0	−10·4	Definition bad.
				β *Libræ.*				
May 13	23	M	2	F	+ 1·7	−24·8	−23·3	Spectrum bright, bu tremulous.
				α *Coronæ Borealis.*				
May 4	2	M	4	F	+ 0·7	−26·6	−23·8	Star-line very difficult t bisect.
14	0	M	2	F	+ 2·8	+12·8	+19·6	Spectrum bright; defini tion fair.
20	23	N	2	F	+ 4·2	−16·2	−15·0	
July 5	23	M	2	F	+11·4	+24·3	+24·3	Definition fair.
				α *Serpentis.*				
June 29	0	M	2	b_1	+11·7	− 4·0	− 1·5	Star-lines very faint; de finition poor.
				β *Serpentis.*				
May 14	0	M	2	F	+ 1·3	−14·2	−16·2	Star-line well seen.
				γ *Herculis.*				
May 14	1	M	1	F	− 1·1	−36·9	−38·8	Observation interrupted by cloud.
				α *Ophiuchi.*				
July 5	23	M	2	F	+ 5·7	−19·7	−19·6	Definition fair.
				γ *Draconis.*				
June 29	1	M	2	b_1	+ 0·9	+20·9	+33·7	Definition bad; star-lines seen with great difficulty
				Vega.				
July 6	0	M	2	F	+ 0·0	−12·9	−11·9	Definition fair.
Aug. 10	23	N	2	F	+ 4·8	−29·7	−31·3	Spectrum bright and steady; definition good.

Date. 1886.	h	Obs.	No. of Meas.	Line.	Earth's Motion in miles per sec.	Concluded Motion of Star. Meas.	Estimd.	Remarks.
				Vega.				
Oct. 13	20	M	2	F	+ 8·7	−60·8	−48·6	Observations interrupted by cloud.
22	19	M	2	F	+ 8·5	−58·6	−44·8	Spectrum bright and steady.
				Altair.				
July 6	1	M	2	F	− 4·3	−23·7	−21·5	Definition fair.
Aug. 10	23	N	2	F	+ 4·9	−31·2	−32·8	Star-line broad and diffused.
Oct. 18	22	M	2	F	+16·1	−67·6	−54·4	Spectrum very faint and tremulous.
22	20	M	1	F	+16·2	−42·9	−38·5	Spectrum bright and fairly steady.
				γ Cygni.				
June 29	1	M	2	b_1	− 6·9	+ 9·9	+12·2	Definition very bad.
				α Cygni.				
June 29	2	M	2	b_1	− 7·4	+ 0·5	− 0·6	Definition bad; star-lines seen with great difficulty.
July 6	1	M	2	F	− 6·8	−22·1	−23·0	Definition fair.
Oct. 18	22	M	2	F	+ 7·3	−55·3	−45·6	Definition fair.
				α Pegasi.				
Jan. 27	19	M	4	F	+12·4	−34·4	−26·1	Measures made with great difficulty.
Feb. 1	19	M	2	F	+11·2	−35·8	−25·1	Definition bad; measures rough.
Aug. 11	1	N	2	F	− 9·3	+ 3·4	+ 5·4	Spectrum faint.
				Mars.				
Mar. 17	22	M	4	b_1		+10·8	+15·9	Definition fair; calculated motion +2·0.
23	23	N	4	b_1		− 6·9	− 9·0	Planet-line faint; calculated motion +3·3.
Apr. 6	23	N	2	F		+ 2·3	+ 1·5	Calculated motion +5·6.
22	23	N	1	F		+ 1·8	0·0	Calculated motion +7·3.
30	22	N	2	F		+ 5·1	+ 4·0	Calculated motion +7·8.
May 4	0	M	4	F		− 7·2	− 7·4	Definition fair; calculated motion +8·0.
				Venus.				
Jan. 16	18	M	10	F		− 6·8	− 7·7	Computed motion −6·7.
27	18	M	10	F		−13·6	− 7·6	Computed motion −5·4.

Moon.

Date.	h	Obs.	No. of Meas.	Line.	Motion Measured.	Remarks.
Jan. 18	23	N	4	F	+2·5	The coincidence of the two spectra appeared perfect.
Mar. 17	22	M	5	b_1	−0·1	
May 13	23	M	5	F	+0·2	
15	23	M	5	F	−1·1	
18	23	N	4	F	−1·5	
20	23	N	4	F	−4·6	
June 15	23	N	4	b_1	−5·4	
Aug. 10	23	N	5	F	−1·9	
Nov. 5	23	M	5	F	(+5·5)	The comparison was not quite satisfactory.
18	3	M	5	F	+0·3	The coincidence of the two spectra appeared perfect.
Dec. 4	22	M	5	F	+0·9	

Sky.

Jan. 28	12	M	5	F	+1·2	The coincidence of the two spectra appeared perfect.
Feb. 2	12	M	5	F	+3·2	
Mar. 4	12	M	5	F	−2·1	No want of coincidence could be detected.
24	12	N	3	F	−2·5	The coincidence of the two spectra appeared perfect.
May 3	10	M	5	F	−0·6	
June 8	10	M	5	b_1	+4·1	
29	12	M	5	b_1	−0·9	
July 6	13	M	5	F	+1·8	
Nov. 30	12	M	5	F	−2·0	No want of coincidence could be detected.

Rotation of Jupiter.

Displacement between the p and f limbs.

						$p-f$.	
May 15	23	M	5	F		+32·3	Position-angle of slit 26°. The mean point observed was about 0″·5 from the limb. Definition fair.

Computed relative motion of the limbs $p - f + 30{\cdot}9$ miles per second, the equatorial diameter of *Jupiter* being taken as 88,000 miles, and its period of rotation as $9^h\ 56^m$.

Observatory, Greenwich, in the year 1886.

(*Communicated by the Astronomer Royal.*)

Occultations of Stars by the Moon.

Day of Obs.		Phenomenon.		Telescope.	Power.	Moon's Limb.	Mean Solar Time of Observation. h m s	Observer.
1886, Jan.	14	Disapp.	Bradley 381	Altaz.	100	Dark	7 8 24·46	H.
	16	Reapp.	θ^2 Tauri	E. Eq.	70	Bright	4 56 18·41	H.
	16	,,	θ^2 Tauri	Simms' Eq.	220	,,	4 56 17·65	L.
	16	,,	θ^1 Tauri	E. Eq.	70	,,	4 57 59·03	H.
	16	Disapp.	Bradley 619	N. Eq.	80	Dark	4 58 15·31	C.
	16	,,	Aldebaran	N. Eq.	80	,,	7 47 37·09	C.
	16 (*a*)	,,	Aldebaran	S.E. Eq.	220	,,	7 47 36·03	M.
	16	,,	Aldebaran	Altaz.	100	,,	7 47 37·27	L.
	16	,,	Aldebaran	E. Eq.	70	,,	7 47 37·05	H.
	16 (*b*)	Reapp.	Aldebaran	N. Eq.	80	Bright	8 48 27·45	C.
	16 (*c*)	,,	Aldebaran	S.E. Eq.	220	,,	8 48 28·07	M.
	16 (*d*)	,,	Aldebaran	Altaz.	100	,,	8 48 28·23	L.
	16 (*e*)	,,	Aldebaran	E. Eq.	70	,,	8 48 (31·81)	H.
	18	Disapp.	26 Geminorum	E. Eq.	70	Dark	8 37 14·94	L.
	18	,,	26 Geminorum	Altaz.	100	,,	8 37 15·48	H.
Mar.	9 (*f*)	,,	ξ^1 Ceti	Lassell Refl.	130	,,	6 34 24·38	H. T.
	9	,,	ξ^1 Ceti	Altaz.	100	,,	6 34 23·77	A. D.
	9 (*g*)	,,	ξ^1 Ceti	E. Eq.	70	,,	6 34 24·33	L.
	9	Reapp.	ξ^1 Ceti	Simms' Eq.	80	Bright	7 39 27·58	H. T.
	9	,,	64 Ceti	E. Eq.	70	,,	6 38 3·23	L.